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a rotor arranged at a side of an inner periphery of
said stator with a rotation air gap;

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said rotor having plural permanent magnet insertion
holes arranged with a ring form, permanent magnets embedded in
said plural permanent magnet insertion holes, and auxiliary
magnetic pole portions provided between two adjacent plural
permanent magnets, wherein

a magnetic air gap is provided in both sides of a
peripheral direction of said plural permanent magnets,

thereby a change in a magnetic flux density between
said plural permanent magnets and said auxiliary magnetic pole
portions is formed smoothly and a cogging torque is restrained.

19. A permanent magnet electric rotating machine
comprising:

a stator; and

a rotor arranged at a side of an inner periphery of
said stator with a rotation air gap;

said rotor having plural permanent magnet insertion
holes arranged with a ring form, permanent magnets embedded in
said plural permanent magnet insertion holes, auxiliary magnetic
pole portions provided between two adjacent plural permanent
magnets, and magnetic pole piece portions arranged between said
plural permanents magnets and said stator, wherein

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a magnetic air gap is provided between said auxiliary magnetic pole portions and said magnetic pole piece portions,

thereby a change in a magnetic flux density between said plural permanent magnets and said auxiliary magnetic pole portion is formed smoothly and a cogging torque is restrained.

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~~20~~. A permanent magnet electric rotating machine according to claim ¹~~18~~, wherein a non-magnetic material is provided in said magnetic air gap.

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~~21~~. A permanent magnet electric rotating machine according to claim ⁶~~19~~, wherein a non-magnetic material is provided in said magnetic air gap.

22. An electromotive vehicle comprising a drive device, wherein said drive device includes the permanent magnet electric rotating machine according to claim 18.

23. An electromotive vehicle comprising a drive device, wherein said drive device includes the permanent magnet electric rotating machine according to claim 19.

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